

One-Stage Immediate Breast Reconstruction With Implant Following Skin-Sparing Mastectomy in Asian Patients

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Abstract: The Asian breast reconstruction patient is usually of lower mean age, lower body mass index (BMI), and has relatively small breasts. This study aimed to investigate the outcome of 1-stage immediate breast reconstruction using saline-filled implants in the Asian patients.

Between April 2002 and July 2005, 30 patients underwent skin-sparing mastectomy and 1-stage immediate breast reconstruction with a saline-filled implant. Mean age was 42.9 years, with a mean BMI of 21.9 and a mean implant volume of 283 mL.

The overall success rate was 96.6%, with 1 case of implant exposure secondary to chest skin necrosis. At mean follow-up of 21.5 months (range 6 to 40 months), 1 patient developed local recurrence (3.33%).

Perfusion of the chest skin flap is reliable enough to allow 1-stage breast reconstruction with small saline-filled breast implants. We present this as an additional option for immediate breast reconstruction in thin women with small breasts.

Key Words: 1-stage immediate breast reconstruction, saline-filled implant, skin-sparing mastectomy

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Immediate breast reconstruction following mastectomy has been shown to be psychologically beneficial and cost-effective. Advantages of immediate breast reconstruction include less general anesthesia and operative procedures, technically easier operation due to virgin tissue without prior scarring or radiotherapy, and better esthetic results.^{1,2} Optimal esthetic results are attained by using a skin-sparing mastectomy (SSM), which allows preservation of uninvolved native breast skin and the original inframammary fold.³ Positioning and shaping of the breast mound are therefore

facilitated; also, visible scarring is reduced, and normal color, texture, and sensation of the breast skin are preserved.^{4,5} There have been several studies reporting that SSM does not increase the risk of tumor recurrence.^{2,6–8} Among the various immediate breast reconstruction methods available, autologous tissue has been accepted as the gold standard option, whether in the form of a free or pedicled transverse rectus abdominis myocutaneous (TRAM) flap.^{9–11} In low-body-mass-index (BMI) women with small but high-projection breasts, autologous tissue may not be the best choice due to inadequate donor autologous tissue volume. In such situations, alternatives include tissue expansion using an expander, followed by second-stage insertion of a definitive implant.⁴ The objective of this study was to investigate the oncologic safety, complication rate and satisfaction rate of the patients who underwent immediate 1-stage breast reconstruction with a saline-filled implant following SSM.

MATERIALS AND METHODS

Between April 2002 and July 2005, there were 30 consecutive patients with a mean age of 42.9 years (range, 29 to 63 years) undergoing 1-stage immediate breast reconstruction using saline-filled implants following SSM (Table 1). Breast reconstructions were performed on the right side in 13 patients and on the left side in 17 patients. Pathologic staging using American Joint Committee on Cancer (AJCC) criteria were as follows: stage 0 in 6 patients, stage 1 in 14 patients, stage 2 in 9 patients, and stage 3 in 1 patient. The patients were selected as candidates for immediate reconstruction under evaluation by both the general and plastic surgeon in the outpatient clinic. Patients with metastatic disease and evidence of spread beyond local disease were excluded for immediate reconstruction.

Patient satisfaction was evaluated by a postoperative questionnaire adopted from the Michigan Breast Reconstruction Outcome Study (Table 2).^{11a} The questionnaire had 2 subscales, including 7 items assessing both general satisfaction with the reconstruction (5 items) and esthetic satisfaction (2 items). Patients were asked to respond to each item using a 5-point Likert scale. Item responses ranged from 1 (very unsatisfied) to 5 (very satisfied). Responses for each of the subscales were dichotomized into “satisfied” versus “dissatisfied” using the following criteria: scores of “satisfied” or “very satisfied” (a 4 or 5 on the 5-point Likert scale) for all

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TABLE 1. Thirty Consecutive Patients Underwent Immediate Breast Reconstruction Using a Saline-Filled Implant Following Skin-Sparing Mastectomy

No.	Age	Volume Injected (mL)	Implant Size (mL)	Complication
1	63	400	425	
2	44	345	360	
3	37	240	240	
4	49	400	425	Local recurrence
5	32	210	210	
6	37	300	300	
7	33	180	180	
8	29	150	150	
9	42	310	330	
10	59	300	300	
11	32	230	240	
12	52	330	300	
13	44	170	180	
14	39	210	210	
15	42	300	300	
16	54	450	450	Mastectomy chest-skin necrosis
17	51	210	210	
18	33	380	360	
19	56	330	330	Capsular contracture
20	42	150	150	
21	37	360	360	
22	51	270	270	
23	45	330	330	
24	34	270	270	Mastectomy chest-skin necrosis, failure
25	46	330	330	Infection
26	49	270	270	
27	37	270	270	
28	31	325	325	
29	44	270	270	
30	38	200	200	
Mean	42.7	283	284.8	

subscales were considered to be satisfied; all other scores were considered to be dissatisfied.

Surgical Technique

Surgical excision of the breast lesion was planned cooperatively by the plastic surgeon and general surgeon. Markings included the midline, bilateral inframammary folds (IMF), local incision margins, including the biopsy site, the skin overlying the tumor, and nipple-areolar complex in standing position. Modified radical mastectomy through the skin-sparing approach, with or without axillary dissection, was performed by the general surgeon. After completion of the mastectomy, all instruments and drapes were changed. The pectoralis major was elevated, with division of the origin at the medial and inferior borders. A breast pocket was created just lateral to the sternal border, superiorly to the clavicle, laterally to the anterior axillary line, and inferiorly to the IMF. A 1- \times -1-cm piece of costal cartilage with perichon-

TABLE 2. Questions Related to Satisfaction With the Reconstruction

Subscale: general satisfaction

1. Knowing what I know today, I would definitely choose to have breast reconstruction.
2. Knowing what I know today, I would definitely choose to have the type of reconstruction I had.
3. Overall, I am satisfied with my reconstruction.
4. I would recommend the type of reconstructive procedure that I had to a friend.
5. I felt that I received sufficient information about my reconstruction options to make an informed choice between either the TRAM or an implant procedure.

Subscale: esthetic satisfaction

1. The size and shape of my breasts are the same.
2. My reconstructed breast(s) feel soft to the touch.

Adopted from the Michigan Breast Reconstruction Outcome Study (Alderman et al. *Plast Reconstr Surg.* 2000;106:769–776).

drium was harvested from the fourth rib and banked for nipple reconstruction later. The contralateral IMF, previously marked with the patient in standing position, was used as a guide for the creation of the new IMF on the reconstructed side. After hemostasis, a mammary sizer (Mentor) was inserted into the subpectoral pocket, with temporary approximation of the chest wall skin with staples. The size of the reconstructed breast was adjusted by injecting normal saline or air into the sizer to achieve bilateral breast symmetry. The chest wall skin was reevaluated after wound closure to guard against excessive tissue tension. Patients with venous-compromised skin had the compromised skin trimmed. Patients with pale skin secondary to arterial compromise had the implant size reduced until the circulation returned to normal. In this series, there were no patients that required insertion of an expander rather than an implant, although that is another option in arterially compromised skin.

The sizer was then replaced by a saline-filled prosthesis of the estimated size. A suction drain was placed laterally in the axilla and the cartilage banked above the pectoralis major at the medial border of the reconstructed breast. The subcutaneous tissue was approximated with 3-0 Vicryl suture and then the implant was inflated to the final estimated size. The skin was closed with a subcuticular 4-0 Monocryl suture.

Postoperative Care

Antibiotic prophylaxis used for this procedure was cefamezine and gentamycin for 3 days. The surgical dressing was removed on postoperative day 2 and a soft nonwired bra advised to support the reconstructed breast.

Postoperative Chemotherapy and Hormone Therapy

The postoperative treatments and follow-up visits were registered annually based on specific forms. Patients' records in the cancer registry are linked with the national civil registry system to obtain detailed information of death. The histologic grade was defined according to the Scarff-Bloom-Richardson (SBR) grade. Immunohistochemical analysis was

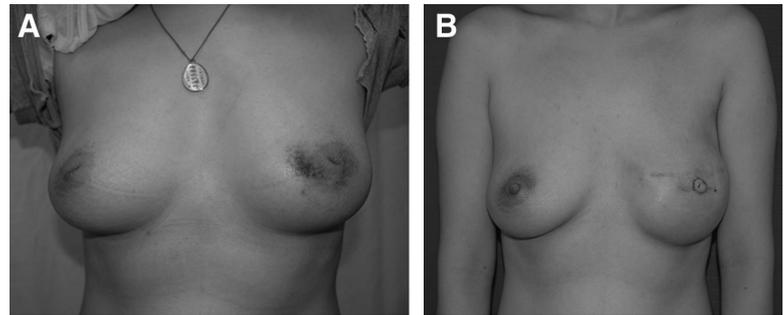


FIGURE 1. A 44-year-old female with left breast cancer (ductal carcinoma in situ with multiple foci, TisN0M0), (A) preoperative anterior view, (B) 3 months post-skin-sparing mastectomy and immediate reconstruction with saline-filled implant.

used to determine estrogen receptor (ER) and progesterone receptor (PR) status; nuclear staining of more than 10% was considered positive. Patients were assigned a risk category for relapse and treated as per our hospital guidelines.

RESULTS

Mean body weight was 54.5 kg (range, 40.0–70.5 kg), and the mean BMI was 21.9 (range, 17.8–25.4). Mean volume of the 30 implants was inflated to 283 mL (range, 150–450 mL) (Table 1).

Mastectomy chest skin necrosis occurred in 2 patients, necessitating eventual removal of the implant in one case. In the other case, the wound healed by secondary intention. Capsular contracture was graded using Baker's grading system as grade I in 21 patients, grade II in 6 patients, grade III in 2 patients, and only 1 patient was grade IV and required capsulotomy to release deforming capsular contracture. Infection was encountered in 1 patient and the implant salvaged using systemic antibiotic therapy.

Recovery time was short, with discharge at 4 days on average. A rapid return to normal activities and/or work was reported at follow-up.

Nineteen patients received adjuvant postoperative chemotherapy, and 7 patients had hormone therapy. None of these adjuvant therapies was delayed by the reconstructive surgery. At a mean follow-up of 21.5 months (range, 6–40 months), one patient developed local recurrence (stage II, occurred 19 months postoperation).

Among these 30 patients, 27 patients were evaluated by the Breast Reconstruction Outcome questionnaire; the remaining 3 were lost to follow-up. For 26 of the patients, all

7 items were above 4 Likert points and classified as satisfied. One patient was classified as dissatisfied because 3 of the 7 items for this patient were below 4 points. In this limited series, the satisfaction rate was high, at 96.3% (Figs. 1 and 2).

DISCUSSION

Indications for immediate 1-stage implant breast reconstruction include low-BMI women with small breasts and limited abdominal tissue and patients requesting a more rapid recovery time. Contraindications to breast-conserving surgery include the requirement for adjuvant radiotherapy, pregnancy (first and second trimesters), multicentric breast cancer (>1 quadrant), and extensive microcalcification on mammography. The SSM was first described using maximal mastectomy skin preservation and facilitating breast reconstruction in 1991 by Toth and Lappert.¹² The procedure preserves most of the breast skin envelope and the IMF; this allows the plastic surgeon to easily fill the residual space with a soft tissue flap or prosthesis. In our series, the general surgeons prefer to perform an elliptical incision that includes the nipple-areola complex and biopsy. Hidalgo et al¹³ have reported no local recurrence in 28 SSM with breast reconstruction at a mean follow-up of 27 months. Carlson et al¹⁰ reported a 4.8% local recurrence rate in 327 SSM, with immediate breast reconstruction at a mean follow-up of 37.5 months. Toth et al¹⁴ reported no local recurrence rate in 50 consecutive patients, with a mean follow-up of 57 months. Crowe et al¹⁵ analyzed approximately 70% of local recurrence occurred after mastectomy in large population in the first 3 years. Kroll et al¹⁶ reported the local recurrence rate of 7.0% after SSM and immediate reconstruction, with the



FIGURE 2. A 54-year-old female with left breast cancer (phyllid tumor T1N0M0, stage 1) underwent skin-sparing and nipple-sparing mastectomy with immediate reconstruction using saline-filled implant. (A) Postoperative anterior view (1 month of follow-up) (B) and 1 year of follow-up, anterior view (C), left lateral view.

TABLE 3. Comparisons of Published Literature With Local Recurrence Rate After Skin-Sparing Mastectomy With Immediate Reconstruction

	Number (Cases)	Tumor Staging	Mean Follow-up Period (mo)	Local Recurrence
Cheng et al (present series)	30	T1–T3	21.5	3.3%
Toth et al, 1999	50	T1–T3	57	0%*
Slavin et al, 1998	51	Tis–T2	44.8	2.0%
Rivadeneira et al, 2000	71	Tis–T2	49	5.6%
Simmons et al, 1999	77	T1–T2	60	3.9%
Gerber et al, 2003	112	T1–T2	59	5.4%
Kroll et al, 1999	114	T1–T2	>72	7.0%
Medina-Franco et al, 2002	173	T1–T3	73†	5.6%
Carlson et al, 2001	327	T1–T4	42.6	4.8%

*No local recurrence but 10% distal metastasis.

†Median follow-up period.

longest follow-up of 6 years. The local recurrence rate of the SSM with immediate reconstruction ranged from 2.0% to 7.0% (Table 2).^{6,16–22} The acceptable recurrence rate encouraged us to keep on performing SSM in breast cancer patients. According to the reports by Carlson et al,⁶ the tumor size was one of the most significant predictors of local recurrence after SSM. Other factors significantly associated with local recurrence were tumor stage, negative PR status, and poor tumor differentiation. These factors were consistent with reported risk factors associated with local recurrence after conventional mastectomy (Table 3).²¹

The other concern regarding SSM is the potential for native skin flap necrosis. A literature review regarding native skin flap necrosis rates ranges widely from 0.0% to 21.6%.^{6,14,17,23} The highest rate of native skin necrosis was reported by Slavin et al¹⁷ (21.6%), yet all the other studies reported figures below 10%. In our 30 case series, there were 2 patients who exhibited native chest skin flap necrosis (6.6%). Overthinning of the native skin flap, larger breasts, obesity, and tobacco smoking may all increase the risk of native skin flap necrosis. There was only 1 smoker in our series, and her chest wall skin did well after mastectomy. One native chest-skin flap necrosis was minor and healed by secondary intention; the other required implant removal. The relatively younger age of the Taiwanese breast cancer patient may contribute to better skin circulation; also, there are fewer smokers among Taiwanese women, which may also have had an effect on vascularity of the native skin flaps in this study. Careful assessment of the skin tension after placement of an appropriately filled sizer allows for any necessary adjustments and maintains immediate 1-stage reconstruction as a “skin-safe” procedure. We have had no need to close the nipple-areola defect using a pursestring suture; this may be due to the relative youth of the patients and attendant elasticity of the dermis or simply be a by-product of the relatively small-sized breasts and the requirement for only small im-

plants. Pursestring closure has been described in other groups but has not been necessary in the Asian patient in this limited series.

The implant is largely (two thirds) under cover of the pectoralis major; thus, there were no reports of a palpable implant edge or rippling. No implant-associated complications were reported by the patients in this series, nor were any such problems noted during follow-up.

The critical question regarding timing of reconstruction (delayed versus immediate) hangs on whether such a procedure will adversely affect the treatment and progress of the breast cancer. The goal of any reconstructive procedure for a mastectomy is to provide the patient with an acceptable breast substitute with an optimal cosmetic result. The advantages of immediate reconstruction include allowing the patient to regain breast form immediately under only 1 anesthesia and a decreased psychologic impact associated with the loss of the breast and allied symbolism of maternal nurturing, sexuality, and femininity. Furthermore, an exact assessment of the defect can be made both in area and in volume, which allows for a more accurate reconstruction than is possible at a secondary procedure.²⁴

If a definitive implant is used, it generally requires only 1 surgical procedure under general anesthesia.⁵ Using a tissue expander requires 2 surgical procedures under general anesthesia.⁶ By using the technique of immediate breast reconstruction with a definitive implant, it can avoid the use of tissue expanders, reducing the number of operations under general anesthesia and associated hospital costs.

Experience has also shown that immediate reconstruction does not increase the risk of cancer recurrence or metastasis.⁸ No clinically apparent differences in healing have been observed when patients are treated with adjuvant chemotherapy. No increase in the occurrence of seroma, hematoma, wound disruption, and infection was encountered in this study.

It is also encouraging that saline-filled implants are a good option for postmastectomy immediate breast reconstruction for patients with small, high-projecting breasts and thin abdomen. Both success rate and patient satisfaction were high in this series. Immediate breast reconstruction plays an important role in the physical and mental rehabilitation of breast cancer patients and has the advantages of (1) reliable perfusion of native chest-wall skin in the Taiwanese female population, (2) rapid recovery time, (3) acceptable cosmetic results, (4) and no need for a 2-stage procedure.

Saline-filled implants are all that are permitted by the Taiwan Department of Health, and we have no experience of using cohesive gel implants or AlloDerm. It is likely that patients will do equally well with alternative appropriately sized and placed prostheses.

Despite the many advantages of immediate breast reconstruction and the high satisfaction rates, the number in the series was relatively small and the follow-up period was only 21.5 months. Recruitment of more cases in the future and longer-term follow-up might provide further valuable information regarding immediate breast reconstruction with sa-

line-filled implants. The long-term benefits and any adverse outcomes warrant further assessment.

CONCLUSION

Immediate breast reconstruction with a saline-filled implant following SSM does not increase the risk of local recurrence or increase the risk of native chest-skin flap necrosis. The recovery time is short and the technique achieves good esthetic results, with a very low complication rate. One-stage immediate breast reconstruction with implants following SSM is an excellent option for the small, high-projecting breasts found in the low-BMI Asian women.

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